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Hardin et al.

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(54) **VIRTUAL CHARACTER VIDEO TOY WITH MOVABLE DISPLAY**

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Related U.S. Application Data

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(60) Provisional application No. 60/733,549, filed on Nov. 4, 2005, provisional application No. 60/756,744, filed on Jan. 6, 2006, provisional application No. 60/849,338, filed on Oct. 2, 2006, provisional application No. 60/849,264, filed on Oct. 2, 2006.

(51) **Int. Cl.**
A63H 3/36 (2006.01)

(52) **U.S. Cl.** **446/175**; 446/82; 446/487

(58) **Field of Classification Search** 446/175, 446/82–84, 478; 345/201–206; 40/409, 40/411, 124.06

See application file for complete search history.

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(57) **ABSTRACT**

A display system is provided. The display system may include a housing and a transparent display screen mounted to the housing, the screen configured to be moved between a first position and a second position. The display system may further include a sensor mounted to the housing to detect screen position in relation to the housing and a character generator configured to generate and display images of a virtual character on the screen.

18 Claims, 8 Drawing Sheets

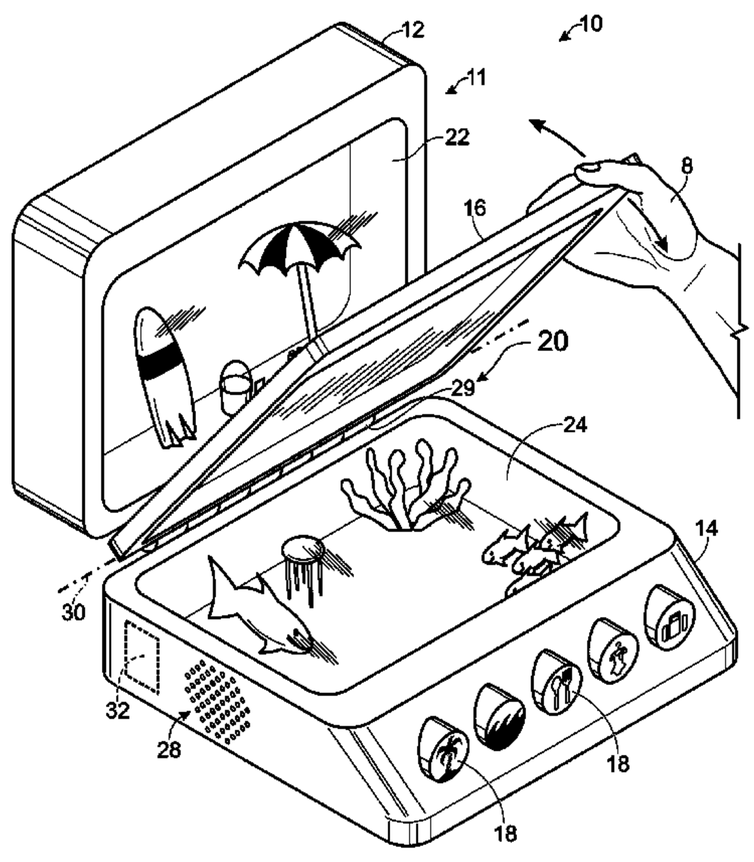

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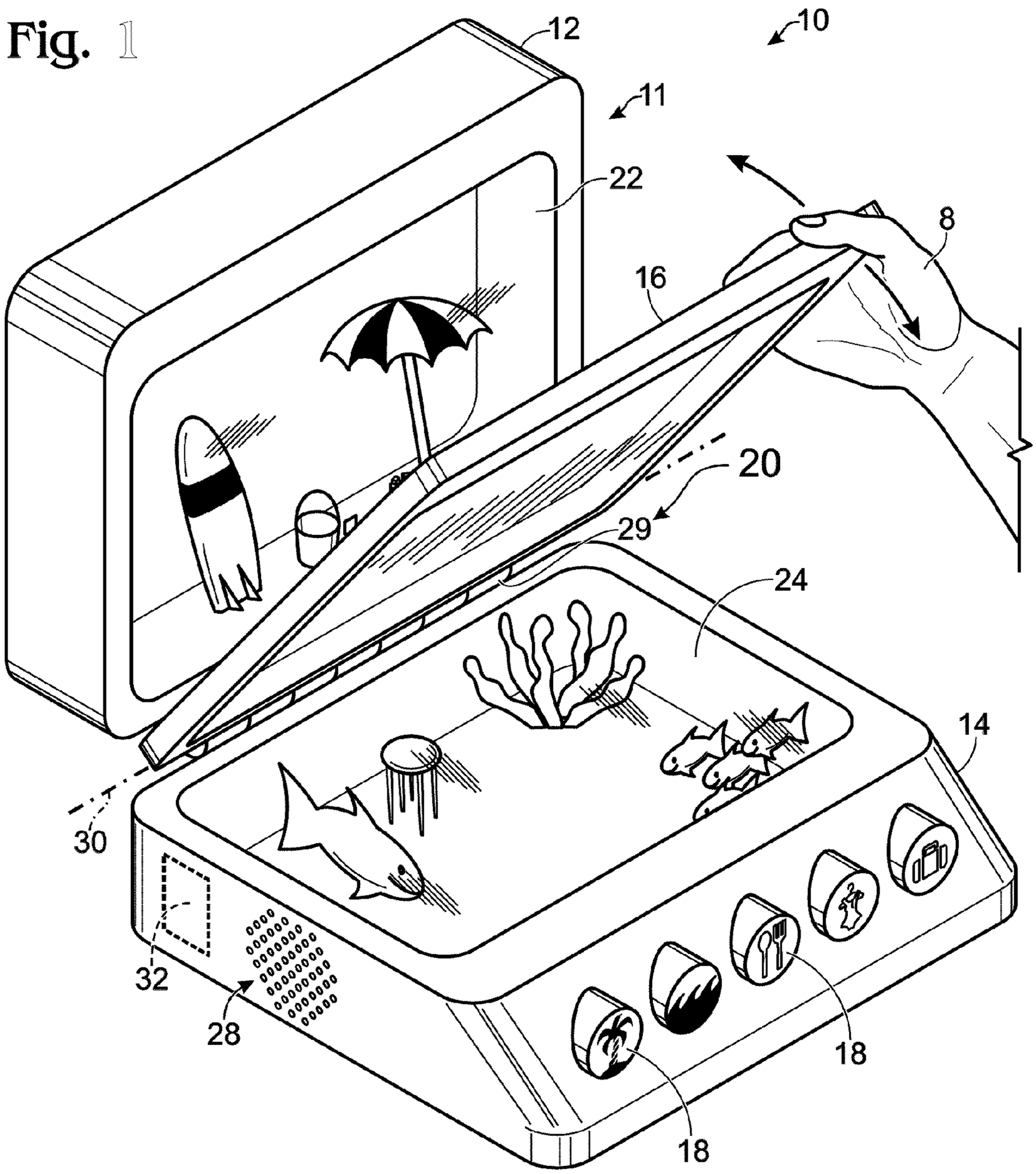
Fig. 1



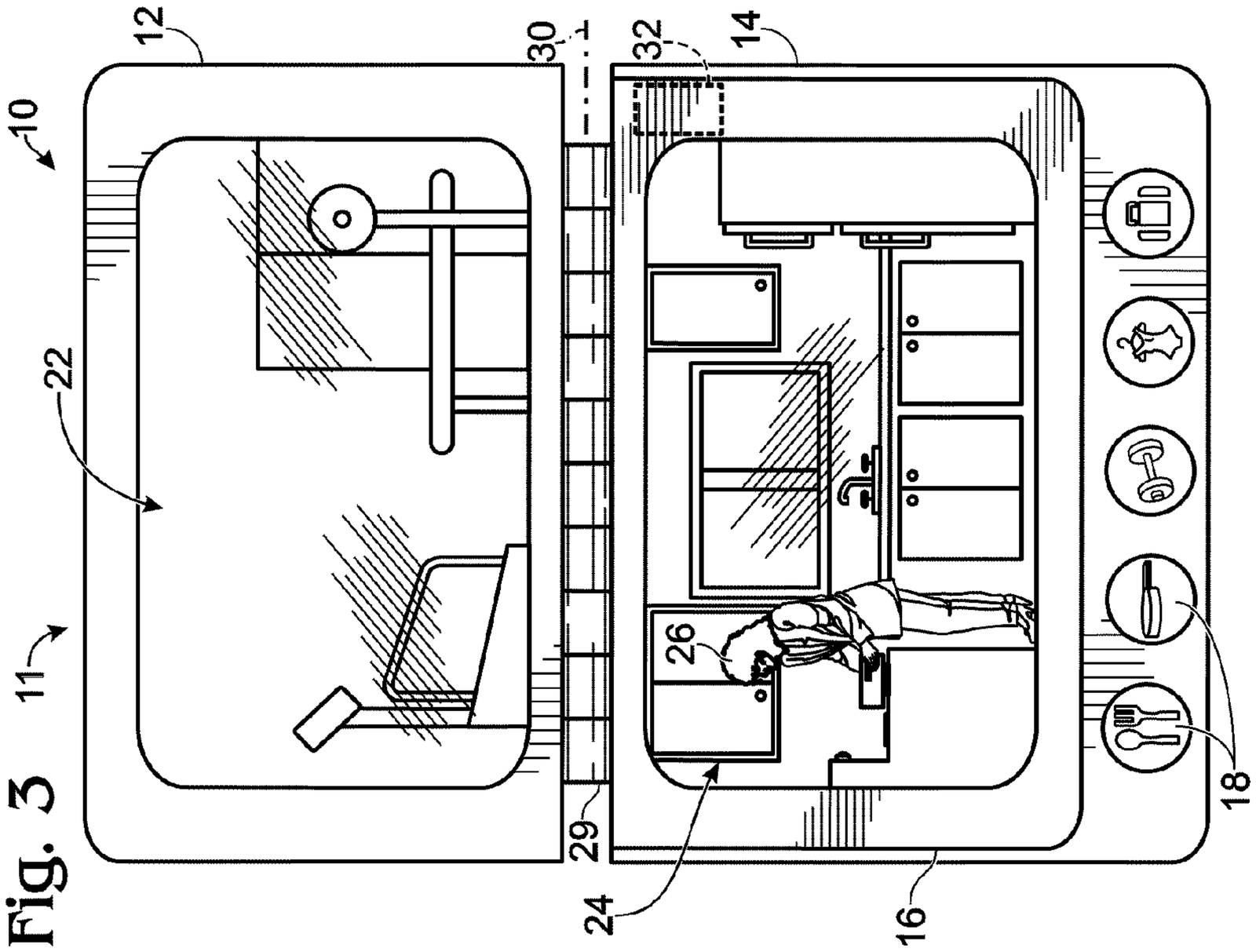


Fig. 3

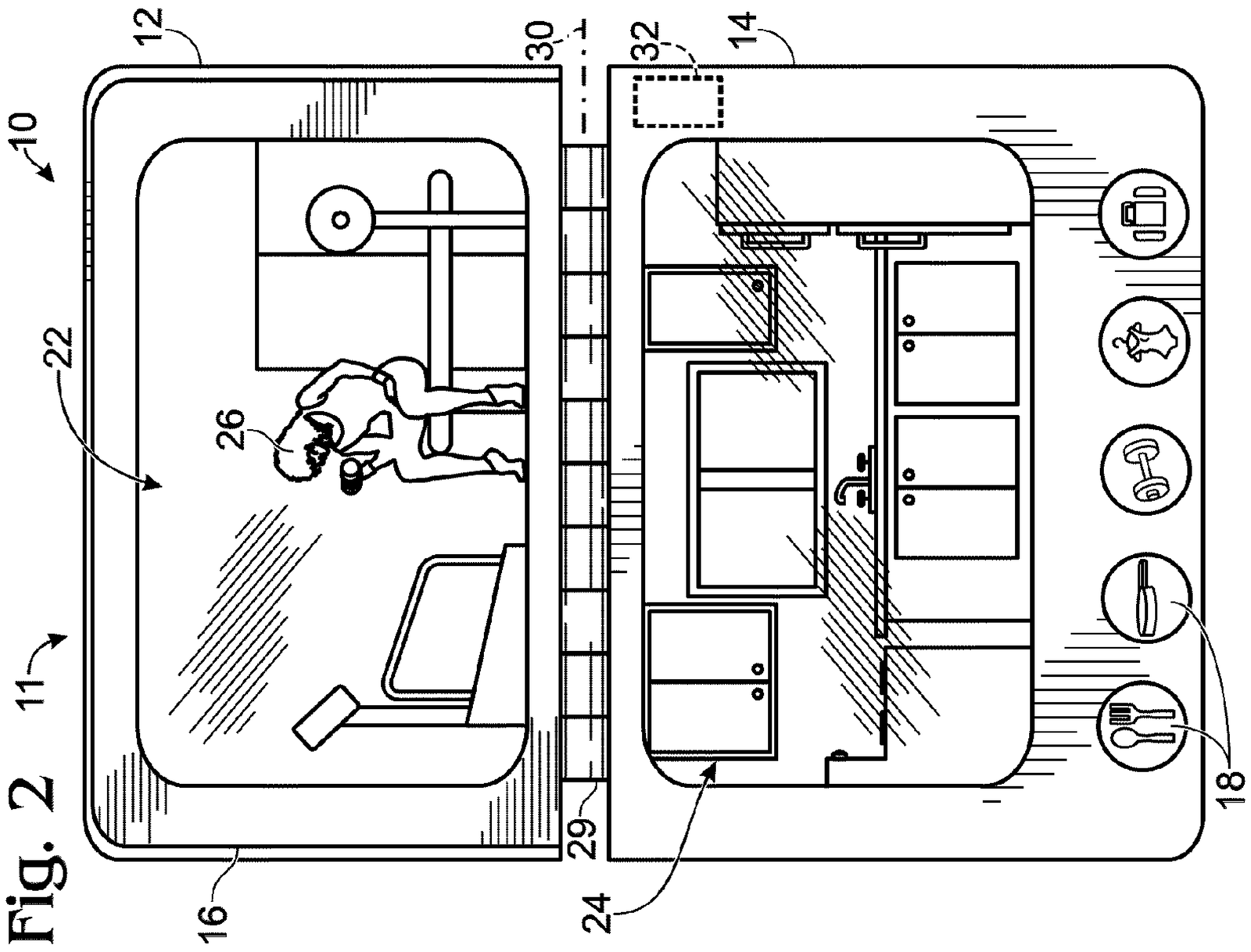


Fig. 2

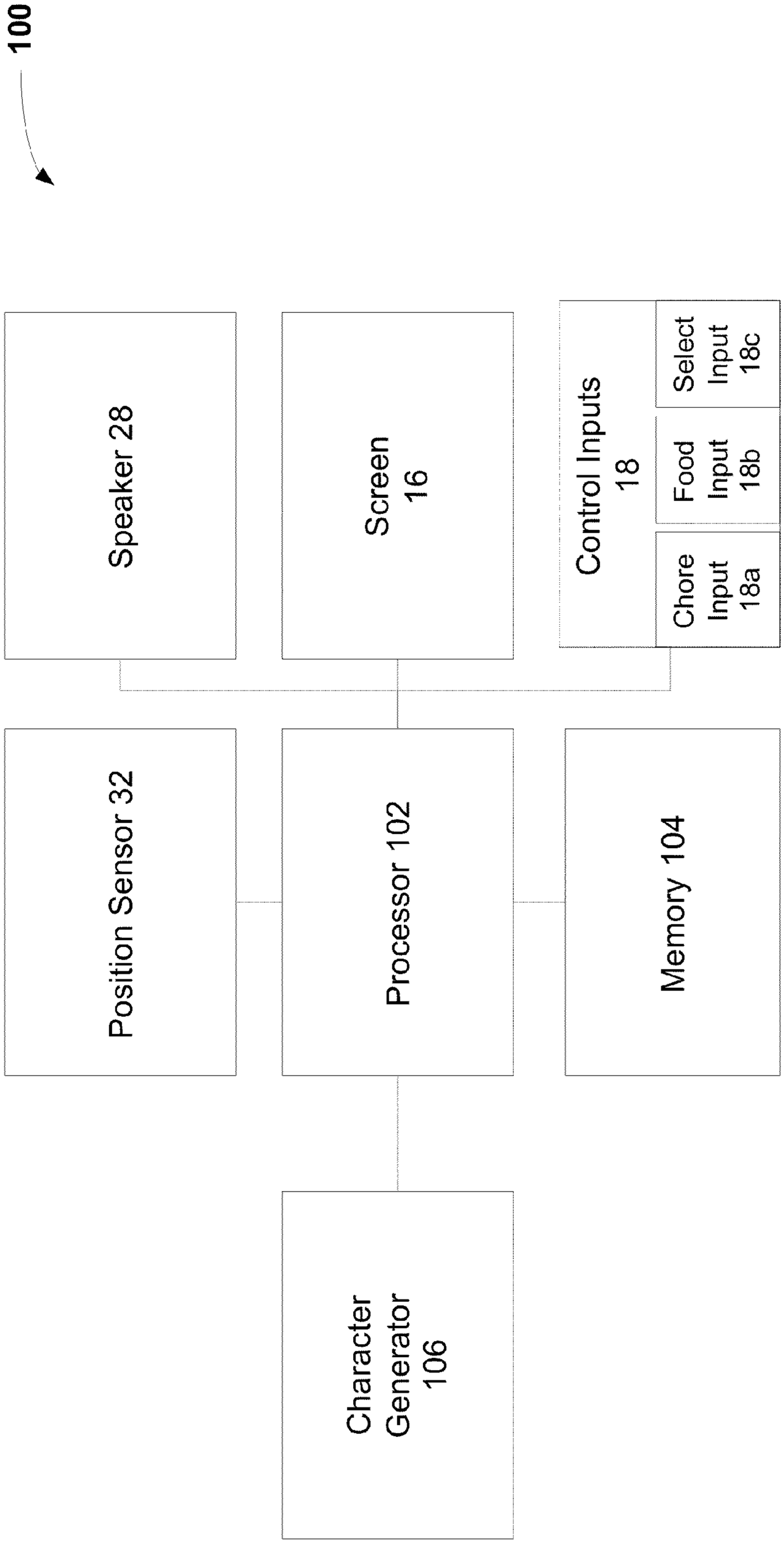

100
Speaker 28
Screen 16
Control Inputs 18
Chore Input 18a
Food Input 18b
Select Input 18c
Position Sensor 32
Processor 102
Memory 104
Character Generator 106

Fig. 4

Fig. 5

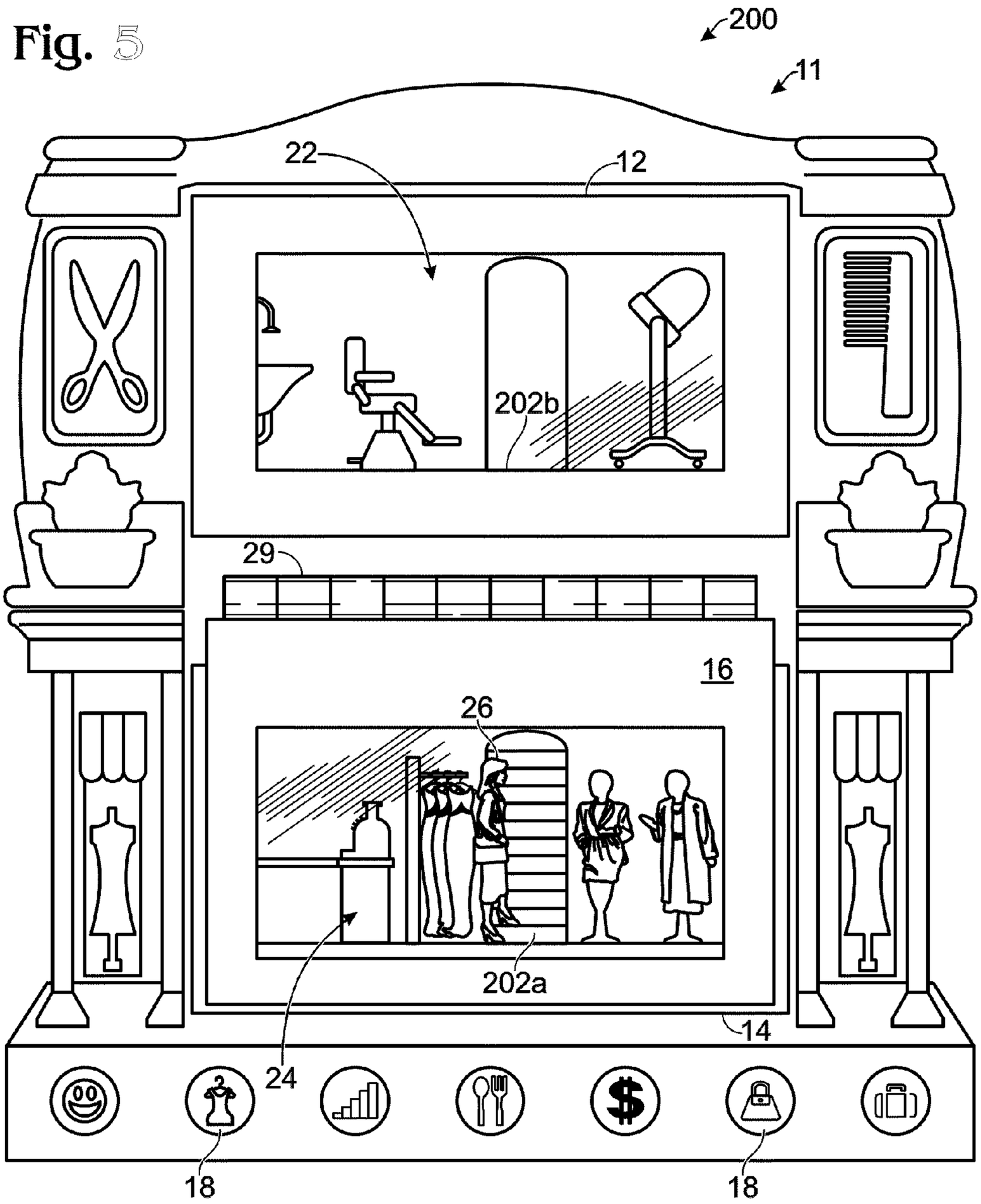
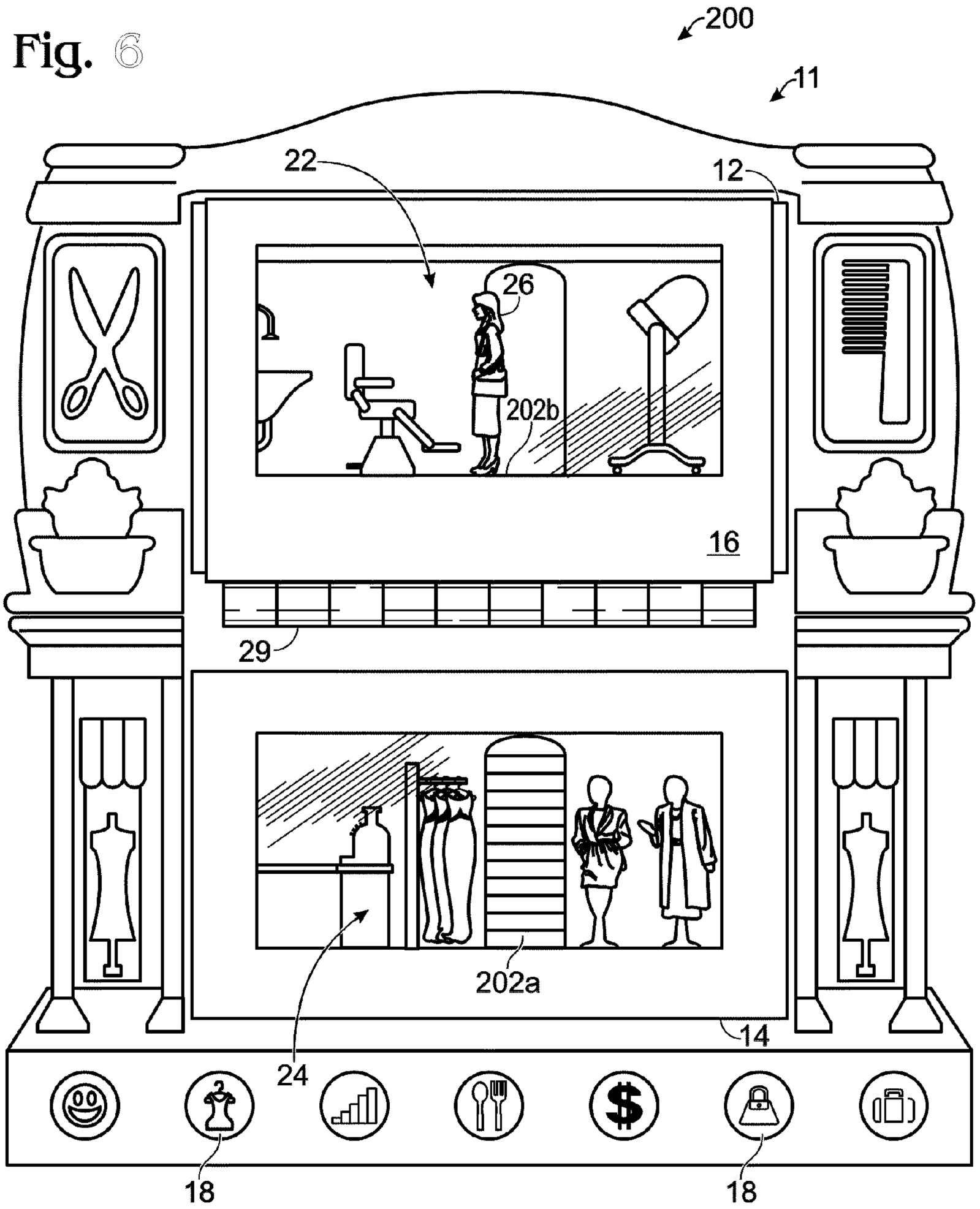


Fig. 6



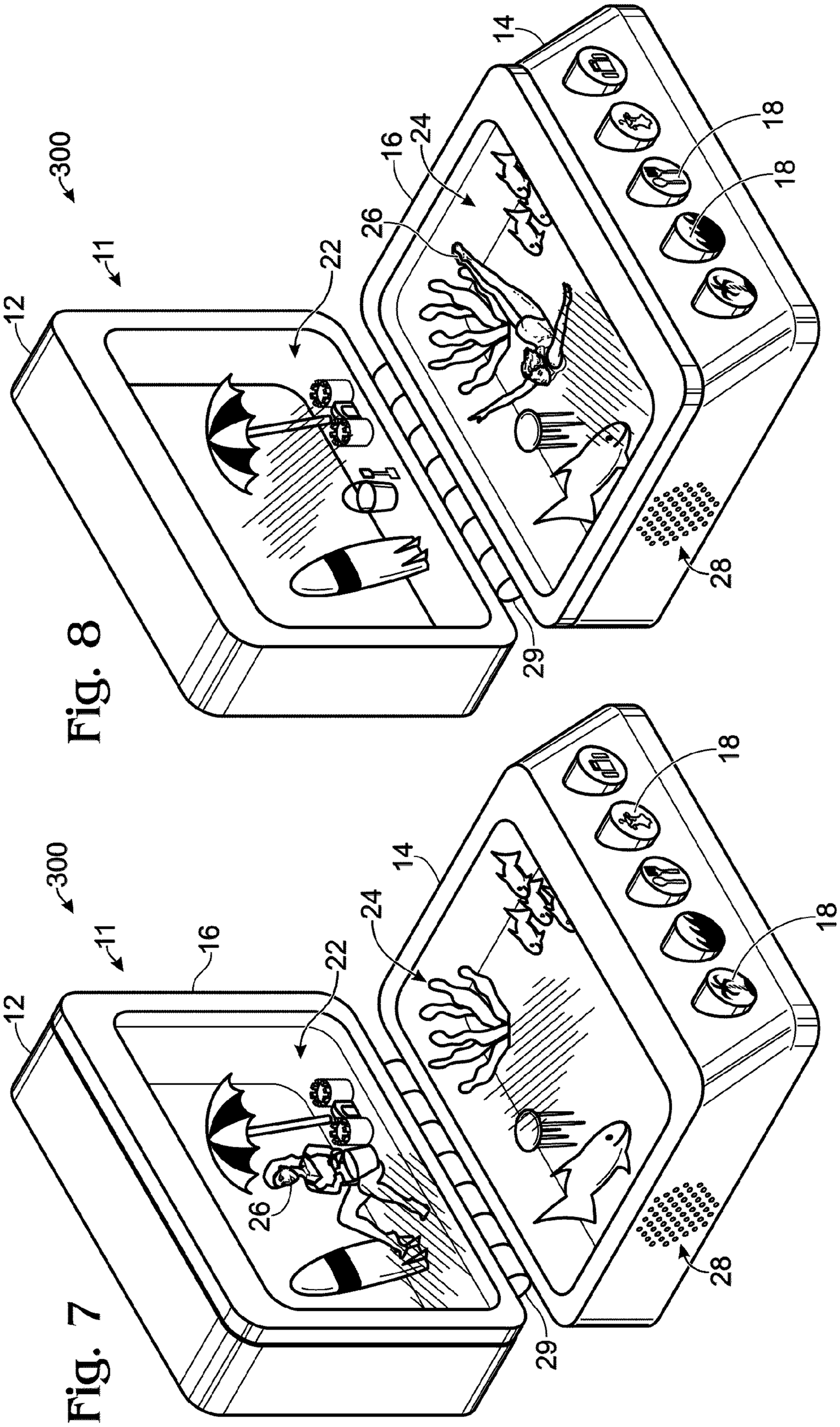

300
11
12
22
16
24
26
14
18
18
28
29

Fig. 8

300
11
12
16
22
24
26
14
18
18
28
29

Fig. 7

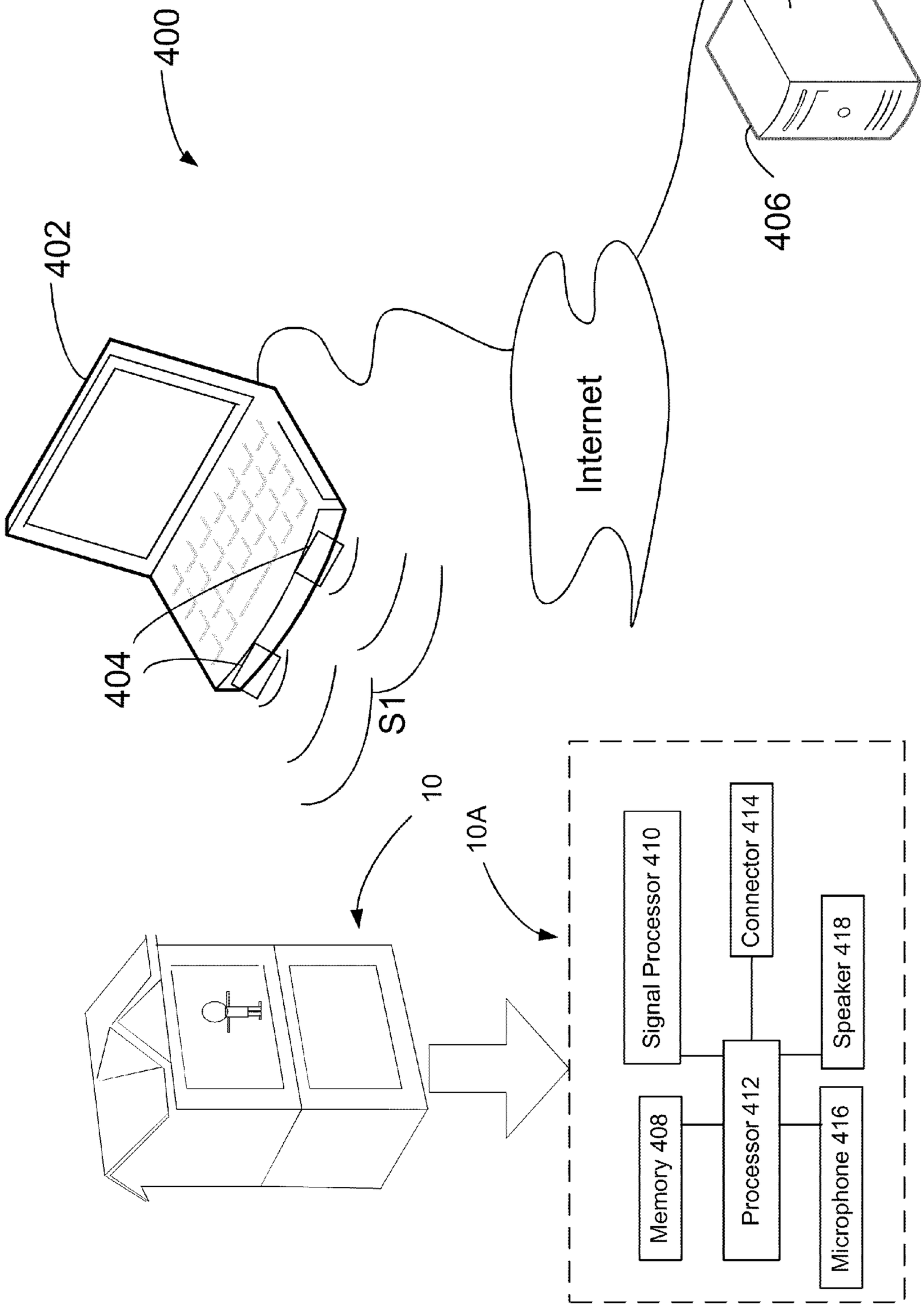

400
402
404
S1
Internet
406
10
10A
Signal Processor 410
Memory 408
Processor 412
Connector 414
Speaker 418
Microphone 416

Fig. 9

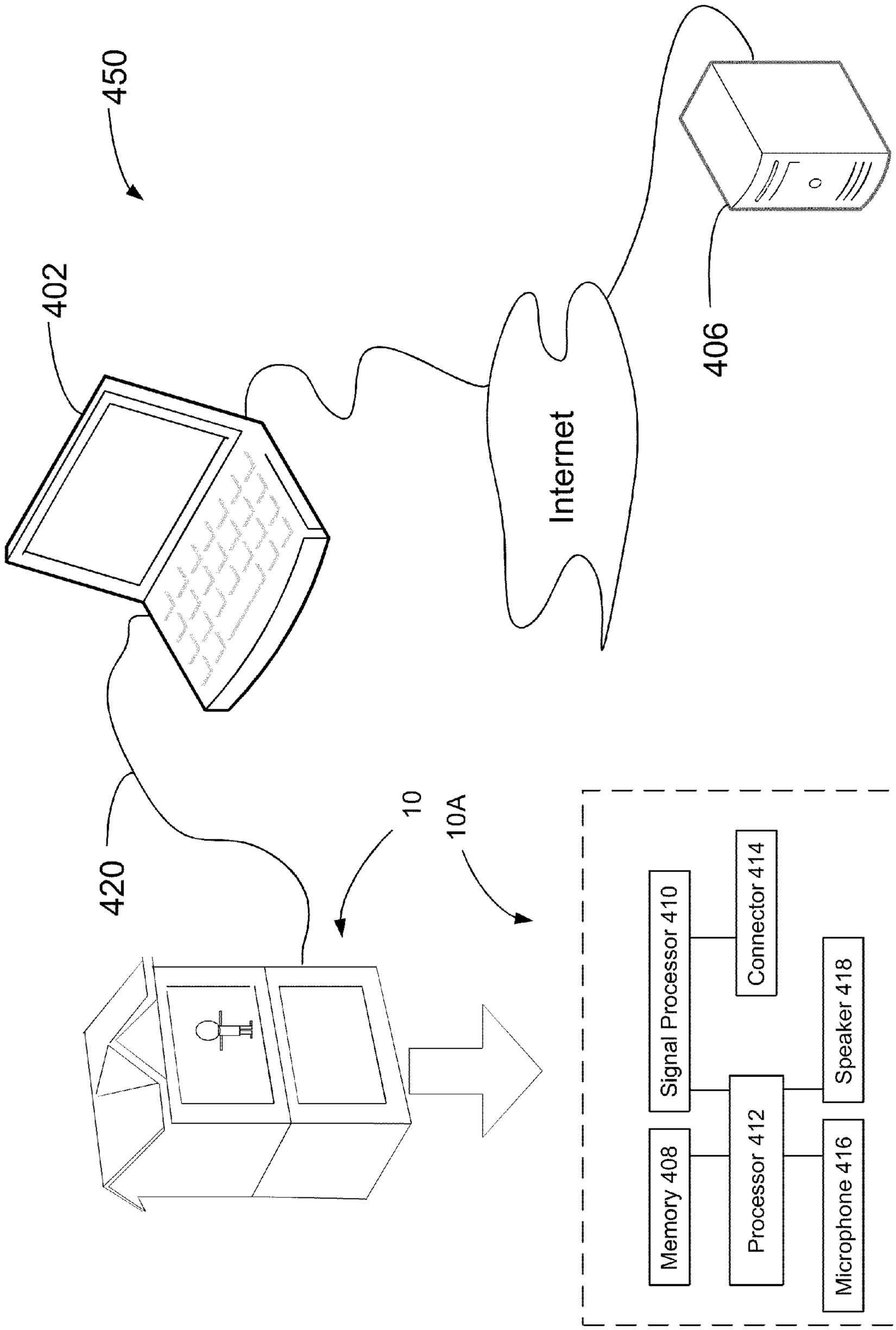

450
402
420
10
10A
406
Internet
Memory 408
Signal Processor 410
Processor 412
Connector 414
Microphone 416
Speaker 418

Fig. 10

VIRTUAL CHARACTER VIDEO TOY WITH MOVABLE DISPLAY

CROSS-REFERENCES

This application is a continuation of U.S. patent application Ser. No. 11/592,749, filed Nov. 3, 2006 and entitled "Virtual Character Video Toy with Movable Display", which application claims priority to U.S. Provisional Application Ser. No. 60/733,549, filed Nov. 4, 2005, and entitled "Virtual Character Video Toy," U.S. Provisional Application Ser. No. 60/756,744, filed Jan. 6, 2006, and entitled "Virtual Character Video Toy," U.S. Provisional Application Ser. No. 60/849,338 filed Oct. 2, 2006, and entitled "Video Toy with Backgrounds and Movable Screen," U.S. Provisional Application Ser. No. 60/849,264 filed Oct. 2, 2006, and entitled "Video Toy with Backgrounds and Alternate Backgrounds," incorporated herein by reference.

BACKGROUND

This disclosure relates to toys with video screens and more specifically relates to toys that may have transparent video screens displaying virtual characters that respond to player inputs and are presented in association with diorama backgrounds.

Examples of video screen toys are found in the following patents and published patent applications: U.S. Pat. Nos. 4,398,723, 4,421,317, 5,966,526, 6,056,618, 6,165,068, 6,213,871, 6,227,966, 6,273,815, 6,449,518, 6,461,238, 6,500,070, 6,537,149, 6,609,968, 6,652,383, 6,722,973, 6,832,955, US2003/0216160, US2004/0133354, US2004/0259635, US2002/0115482, US2005/0119037, US2005/024313, US2005/0245302, and RE35,819. The disclosures of all the patent applications, patent publications, patents and other publications recited in this application are incorporated herein by reference in their entirety for all purposes.

SUMMARY

An interactive video toy is provided that may display at least one virtual character on a transparent video screen. The screen may be attached to a housing including dioramas. The screen may move between a first position with a first diorama visible through the screen and a second position with a second diorama visible through the screen. One or more characters on the screen may appear to be superimposed on the diorama and may appear to interact with diorama objects, such as by sitting on a chair of the diorama. A character may appear to move between dioramas when the screen is rotated to a new position.

Dioramas may have fixtures and features that define the room type or theme. For example, a first diorama may have a television and a sofa in a living room. A second diorama may have a stove, a refrigerator and a table in a kitchen. Other indoor or outdoor themes may also be used. The character when displayed on the screen may respond to the adjacent diorama and engage in activities compatible or consistent with the diorama theme.

For example, with the screen positioned in front of the first diorama, the character may appear to be in a living room and pursue activities associated with free or leisure time. Moving the screen to a position in front of the second diorama, the character may appear to be in a kitchen and may pursue activities associated with cooking.

A user may interact with the character and solicit responses by pressing one or more buttons or providing other input. Buttons may be located on the front or other convenient part of the toy. Each button may be associated with a particular kind of input, or with different buttons providing different kinds of input to allow different kinds of interaction with the characters. Buttons may also provide the same kind of input to allow multiple inputs of the same type. Buttons may be associated with any characteristic or feature associated with a character or theme. For example, buttons may provide inputs associated with eating, socializing and/or doing chores and buttons related to eating may provide inputs for eating solid food, drinking and cooking. Characters may initiate actions independently with no input from the player. The feature or characteristic associated with a button may be different for different themes.

Characters in the video toy may be programmed to engage in additional activities as game play progresses. These additional activities may be associated with the interactions and inputs provided by the player. The character may appear to develop skills and/or personal development. Lack of input from the player may evoke expressions of sadness, loneliness or boredom from the character. Extended lack of input may cause the character to appear to pack and move out of the video toy.

The plural dioramas may be fixed relative to each other or move between relative open and closed positions. The video screen and body segments supporting dioramas may be placed in a closed position in which the screen may be enclosed between body segments, which body segments may protect the screen from damage. The closed position may expose a handle for transporting the toy.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an exemplary video toy including a first housing segment and a second housing segment with a first diorama and a second diorama respectively, control inputs, a speaker, a sensor and a video screen being moved by a user from a first position in front of the first diorama to a second position in front of the second diorama.

FIG. **2** is a perspective view of a video toy similar to FIG. **1** including the housing segments and dioramas, a sensor and a video screen in a first position in front of the first diorama, with a virtual character displayed on the video screen engaged in activities associated with the first diorama.

FIG. **3** is a perspective view of the video toy of FIG. **2**, again including the housing segments and dioramas, but with the video screen in a second position in front of the second diorama and a virtual character displayed on the video screen engaged in activities associated with the second diorama.

FIG. **4** is a component diagram showing functional components of the video toy including a processor, memory, a character generator, a sensor, control inputs, a video screen, a speaker and a screen position sensor.

FIG. **5** is a perspective view of an exemplary video toy with a first diorama of a dress shop and a second diorama of a hair salon above the first diorama with the video screen positioned in front of the lower dress shop and the virtual character displayed going up the stairs to the second diorama.

FIG. **6** is a perspective view of the video toy of FIG. **5** with the video screen rotated to a position in front of the upper diorama hair salon with the virtual character displayed entering the shop from the stairs.

FIG. **7** is a perspective view of an exemplary video toy showing a first diorama of a beach scene and a second diorama of an ocean scene with the video screen positioned in front of the first beach scene diorama and displaying a virtual character.

FIG. **8** is a perspective view of the video toy of FIG. **7** showing the video screen rotated to a position above and adjacent the ocean diorama with a displayed virtual character appearing to swim in the ocean.

FIG. **9** is an exemplary component diagram including a video toy, a computer with speakers and a server connected to the computer through the internet, the video toy shown with internal components including memory, a signal processor, a microprocessor, a connector, a microphone and a speaker.

FIG. **10** is an exemplary component diagram including a video toy connected to a computer by a cable and a server connected to the computer through the internet, the video toy shown with internal components including memory, a signal processor, a microprocessor, a connector, a microphone and a speaker.

DETAILED DESCRIPTION

FIG. **1** is a perspective view of a user **8** with an illustrative example of a video toy **10**. Toy **10** includes a housing **11** including a first housing segment **12** and a second housing segment **14**, a transparent video screen **16** and control inputs **18**. A junction **20** is shown connecting first segment **12**, second segment **14** and screen **16**. User **8** is shown moving screen **16** between a first and a second position.

First housing segment **12** may include a first diorama or scene **22** with features and fixtures to simulate a beach scene. Second segment **14** may have a second distinct diorama or scene **24** simulating an ocean with features and fixtures. Video toy **10** may be programmed to present on video screen **16** a virtual character **26**, described below, and shown in FIGS. **2** and **3**. Video toy **10** may include control inputs **18** and a speaker **28** for user interaction with virtual character **26**.

Transparent screen **16** may be mounted for movement or articulation relative to housing **11** at junction **20**. For example, transparent screen **16** may be moved between a first position adjacent to first diorama **22** and a second position adjacent to second diorama **24**. Each diorama may be visible through screen **16** when the screen is at each respective position. Virtual character **26** may be displayed on video screen **16** and the associated diorama may be visible through the screen when the screen is in the first or the second position.

When the screen is in one of these positions, the character may appear to be superimposed on and/or be part of the diorama. Character **26** may appear to engage in activities related to or associated with the situational context or theme of the diorama. Video screen **16** may also display images of other objects associated with the actions of virtual character **26**. Character **26** may represent a human, an animal, other animate object, or even a normally inanimate object. More than one character and/or object may be displayed simultaneously.

Junction **20** may be of any suitable form that attaches screen **16** to housing segments **12** and **14**, and at least allows movement of the screen between dioramas **22** and **24**, and/or allows movement of one diorama relative to the other. Junction **20** in FIG. **1** is a hinge **29** with an axis **30**. Junction **20** may instead be a universal joint or other connector that allows movement around multiple axes or translation of transparent screen **16**. Toy **10** may include a sensor **32** supported by housing **11** and shown in FIG. **1** as a dotted line. Sensor **32** may detect movement of screen **16**. Housing segment **12** and housing segment **14** may be fixed together and maintain a positional relationship. Alternatively, segment **12** and segment **14** may be connected by junction **20** and the segments may move in relation to each other about junction **20**.

FIG. **2** is a perspective view of another embodiment of video toy **10**. For clarity, similar numbering is used here and for the following figures for parts that are similar to the corresponding parts of the toy shown in the previous figure. Similar to the previous configuration, video toy **10** may have first segment **12**, second segment **14**, and transparent video screen **16**, all interconnected by hinge **29** and may have control inputs **18**. Video screen **16** is shown positioned adjacent to and in front of a first diorama of a gym with typical weight room features and fixtures such as a bench for lifting weights and a running machine. Virtual character **26** is shown lifting a barbell with the diorama visible through screen **16**.

FIG. **3** is another view of video toy **10** of FIG. **2** with the video screen moved to a new position adjacent to and in front of second diorama **24**. The second diorama is shown as a kitchen with features and fixtures of a stove and a table and the diorama is visible through screen **16**. Virtual character **26** is cooking and holding a pot and appears to be working at the stove of the diorama.

FIG. **4** is an exemplary component system **100** of video toy **10**. System **100** includes interconnected components. In this example, the components include screen **16**, control inputs **18**, speaker **28**, screen position sensor **32***a* processor **102**, memory **104** and a character generator or character processor **106**. Processor **102** may be operably connected to screen **16**, control inputs **18**, speaker **28**, screen position sensor **32**, memory **104** and character generator **106**. Character generator **106** may be implemented as an electric circuit, an integrated circuit or other component. Alternately, character generator **106** may be one or more software applications implemented by processor **102** and memory **104**.

Character generator **106** may be programmed and/or configured to generate the image of virtual character **26** displayed on screen **16**. Character generator **106** may be further programmed and/or configured to display character **26** as appearing to engage in activities, speak, interact with the user, display actions connoting emotions and/or elicit responses from the user. Character generator **106** may also generate images of objects, pets, additional characters and/or icons for user selectable options to be displayed on screen **16**.

Screen position sensor **32** may respond to the position of screen **16** or to moving screen **16**. Character generator **106** may respond to sensor **32** indicating rotation of screen **16** by modifying the display of character **26** to maintain a correct orientation with relation to the dioramas. Character generator **106** may rotate and/or invert displayed character **26** and/or translate character **26** from one section of screen **16** to another to maintain consistent character orientation. For example, character **26** may appear to walk from one diorama to the next as a user moves the screen from one diorama to the other.

Character generator **106** or other components of component system **100** may record user inputs at control inputs **18**. Character generator **106** may be further programmed and/or configured to respond to accumulated user inputs by displaying character **26** engaging in additional activities, interactions and/or actions. Generator **106** may provide access to additional character interactions with a user, such as games described below.

User **8** may provide input to toy **10** and character **26** at control inputs **18**. Control inputs **18** may be buttons, joysticks, switches or other appropriate inputs for player interaction. Each control input **18** may be associated with a type of activity. Examples of types of input activities may include any activities appropriate for a diorama theme such as doing chores, selecting clothes, eating, socializing or selecting objects on video screen **16**.

Referring still to FIG. **4**, control inputs **18** shown as examples include chore input button **18***a*; food input button **18***b* and select input button **18***c*. Pressing a button such as a chore button may evoke an appropriate reaction from virtual character **26** such as saying no and putting hands on hips. Character **26** may speak and other sounds associated with activities may be generated at speaker **28** as part of operating toy **10** and game play.

Additional and/or more frequent user input at control input **18** may result in modified responses from virtual character **26**. Virtual character **26** may be displayed engaging in additional activities or actions over the course of game play. The additional activities may resemble personal development and/or improved skills and may be generated by character generator **106** in response to repeated or accumulated inputs by the player at control input **18**. Periods with no input by the player may result in virtual character **26** displaying boredom or petulance. Long periods with no user input may cause virtual character **26** to simulate packing up and moving out of video toy **10**.

User interaction with toy **10** and character **26** may include problem solving. Character generator **106** may be programmed to present problems or issues to user **8** on screen **16**. Problems may be simple and require the user to press a specific input button to resolve the issue. For example, character **26** may indicate that they are hungry. User **8** may push control input food button **18***b* and character **26** may go to the refrigerator for food.

Problems may be more complex and user **8** may be required to select from several options to resolve the issue. Problem resolution options may be displayed on screen **16** and the user may use several buttons of control input **18** or press one or more buttons repeatedly to highlight the preferred option and then select the highlighted or indicated option. The selected option may not resolve the issue and user **8** may be required to select another option.

For example, character **26** may indicate that they are bored. Several options may be displayed that correspond to reading a book, watching television and/or calling a friend. User **8** may use a specific input such as select button **18***c* to select one option. Character **26** may accept the selected option or may reject the selected option. User **8** may then select another displayed option.

Personal development of character **26** may include resolving simple problems without user input and presenting more difficult problems to the user. Personal development may include being more polite and/or exhibiting more maturity. Personal development may include user access to additional activities and applications with character **26**.

Character **26** may play a game with the user such as a guessing game. For example, a plurality of objects may be displayed for selection by the user. Character **26** may provide hints as to which object is the target object of the game. User **8** may use control inputs **18** to select a displayed object based on the hints from character **26**.

Game play may involve accumulating and expending resources. Virtual character **26** may engage in activities that result in earning money. Money earning activities may include chores or a job. Character **26** may expend accumulated money in activities such as shopping. Screen **16** may display the amount of money character **26** has available to spend. User **8** may select the items that character **26** purchases when shopping by using control inputs **18**.

Game play may include positioning characters on the screen. For example, a bird may be displayed on screen **16** appearing to fly in an open window of the diorama. Character **26** may have to catch the bird. User **8** may have to position character **26** using control inputs **18** to catch the bird using a net as the bird appears to fly across the diorama.

Video toy **10** may be configured to connect and interact with other similar video games and to display a second character **26** from the connected video toy. A character from a connected video toy may be displayed as a "visitor" on video screen **16** of toy **10**. The visitor may interact with character **26** acting as a "host," the displayed interaction simulating visiting a friend. Toy **10** may include a male and a female connector to plug into connectors of one or more similar video toys with similar connectors. Toy **10** may make a wireless connection to one or more other toys using a radio, infrared or a different kind of signal. Toy **10** may connect to other toys using a plug-in cable.

Dioramas may be two dimensional or three dimensional. Dioramas may comprise printed images and/or three dimensional objects. During play, dioramas may be stacked vertically, positioned side by side or may be oriented at right angles to each other. Dioramas may have depth. The hinge axis **30** may be vertical rather than horizontal. Alternatively, hinge **29** may be a universal joint that allows motion of screen **16** about more than one axis. Hinge **29** may allow translational motion of screen **16** and/or housing segments **12** and **14**.

FIG. **5** is a perspective view of another embodiment of a video toy **200** similar to video toy **10** of FIG. **1**. First diorama **22** is shown with features and fixtures configured to resemble a clothes shop. Second diorama **24** is positioned above and adjacent to first diorama **22** and is configured to resemble a hair salon. Stairs **202** appear to connect first and second dioramas. Screen **16** in the figure is positioned adjacent to and in front of first diorama **22** with virtual character **26** appearing to climb stairs **202***a* to the second diorama.

FIG. **6** is a perspective view of video toy **200** with screen **16** rotated about hinge or hinge **29** to a position adjacent to and in front of second diorama **24**. Character **26** is displayed at the top of stairs **202***b* entering the hair salon. Character **26** in this figure is viewed from the opposite side of the screen than when viewed with the screen in the position of FIG. **5**. Character **26** has been rotated and/or inverted about a horizontal axis parallel to hinge axis **30** and moved from one area of the screen to another area to maintain a continuity of orientation for character **26**. Without rotation and translation of character **26**, on rotating the screen, character **26** may appear upside down and in a different location in the diorama when viewed from the opposite side.

Character **26** may exit and enter a diorama through a door. Character **26** may exit a first diorama through one door and enter a second diorama through a second door. Other characters may also enter and leave the diorama.

FIG. **7** is a perspective view of another embodiment of video toy **300** similar to video toy **10** including screen **16**, control inputs **18**, first diorama **22** and second diorama **24**. First diorama **22** may be configured to resemble a beach scene with a lifeguard stand and surfboards. Second diorama **24** is configured to resemble an ocean with coral and fish. In use and during play, first housing segment **12** of toy **10** may be positioned vertically and second housing segment **14** may be positioned horizontally or flat on a surface. Screen **16** may be positioned in front of first diorama **22** with characters displayed in appropriate attire. Character **26** may appear to walk towards the ocean depicted in adjacent diorama **24** to swim.

FIG. **8** is another view of video toy **300** including screen **16**, control inputs **18**, first diorama **22** and second diorama **24**. Screen **16** has been moved to a position adjacent to and above second ocean diorama **24**. Character **26** appears to have

moved from diorama **22** to diorama **24** and appears to be swimming among fish and coral.

For the purpose of this disclosure, positioning of screen **16** adjacent or proximate to a diorama means the diorama is vicinal to and visible through the screen such that screen **16** will superimpose the image of virtual character **26** on the diorama. Reversing or inverting the image of virtual character **26** may include rotating the image about an axis passing through the image to maintain an orientation of the character consistent with the diorama. The axis of rotation or inversion may be horizontal or vertical.

Video toy **10** may be associated with a computer and may respond to signals from the computer. FIG. **9** is a component diagram **400** showing video toy **10**, electronic circuitry **10**A of toy **10**, computer **402** with speakers **404** and server **406**. Video toy electronic circuitry **10**A may include memory **408**, a signal processor **410**, a processor **412**, a connector **414**, microphone **416** and speaker **418**. Processor **412** may be operably connected to speaker **418**, memory **408**, signal processor circuit **410**, connector **414** and microphone **416**.

Computer **402** may connect to server **406** over the internet. Server **406** or computer **402** may include software associated with video toy **10**. Toy software at server **406** or computer **402** may generate electrical signals. The electrical signals may be converted to acoustic signals S**1** at computer speaker **404**. Acoustic signal S**1** may be received at microphone **416** and converted to an electrical signal at signal processor **410**. Toy **10** may recognize and respond to the signals from server **406** or computer **402**.

Responding to the audio signal received at microphone **416** may include storing a game in memory **408** or providing access to a game previously saved in toy memory. Responding to the signal may include accessing or storing audio files in memory **408** that may be used to generate sounds at speaker **418**.

Video toy **10** may instead connect to a computer using a cable. FIG. **10** is a component diagram **450** showing video toy **10**, electronic circuitry **10**A of toy **10**, computer **402**, server **406** and cable **420**. Video toy electronic circuitry **10**A may include memory **408**, a signal processor circuit **410**, a processor **412**, a connector **414** and speaker **418**. Processor **412** may be operably connected to memory **408**, signal processor circuit **410**, connector **414** and speaker **418**. Cable **420** may connect toy **10** to computer **402** or other networked processor based equipment. Computer **402** may connect to server **406** over the internet. Server **406** may include software associated with video toy **10**. Toy software at server **406** may generate electrical signals that are received at toy **10**. Signal processor circuit **410** may recognize and respond to the specific signals from server **406**.

Responding to the signal received through connector **414** and cable **420** may include accessing or storing audio files in memory **408** that may be used to generate sounds at speaker **418**. Responding to the signal may include storing a game in memory **408** or providing access to a game, application or file previously stored in toy memory. Responding to the signal may include transferring software and applications from the server to toy **10**.

Computer **402** as used in this disclosure includes laptop computers, personal data assistants, telephones or other processor based electronics. Cable **420** may be a USB cable, an audio cable with terminations commonly referred to as RCA connectors or other signal conducting cable with compatible terminations between computer **402** and toy **10**. Toy speaker **418** may generate sounds as part of game play. Virtual characters may speak or character activities during game play may have associated noises generated at toy speaker **418**. Toy **10** may include indicator lights such as LEDs. Signal processor **410** may be a software application rather than an electronic circuit. Alternatively, signal processor **410** may be an electronic circuit.

While embodiments of a video toy and methods of use have been particularly shown and described, many variations may be made therein. This disclosure may include one or more independent or interdependent inventions directed to various combinations of features, functions, elements and/or properties, one or more of which may be defined in the following claims. Other combinations and sub-combinations of features, functions, elements and/or properties may be claimed later in this or a related application. Such variations, whether they are directed to different combinations or directed to the same combinations, whether different, broader, narrower or equal in scope, are also regarded as included within the subject matter of the present disclosure. An appreciation of the availability or significance of claims not presently claimed may not be presently realized. Accordingly, the foregoing embodiments are illustrative, and no single feature or element, or combination thereof, is essential to all possible combinations that may be claimed in this or a later application. Each claim defines an invention disclosed in the foregoing disclosure, but any one claim does not necessarily encompass all features or combinations that may be claimed. Where the claims recite "a" or "a first" element or the equivalent thereof, such claims include one or more such elements, neither requiring nor excluding two or more such elements. Further, ordinal indicators, such as first, second or third, for identified elements are used to distinguish between the elements, and do not indicate a required or limited number of such elements, and do not indicate a particular position or order of such elements unless otherwise specifically stated.

We claim:

1. A display system comprising:

a housing;

a transparent display screen mounted to the housing, the screen configured to be moved between a first position and a second position;

a sensor mounted to the housing to detect screen position in relation to the housing; and

a character generator configured to generate and display images of a virtual character on the screen;

where the housing includes a first housing segment having a first diorama and a second housing segment having a second diorama, wherein the first diorama is adjacent to the display screen in the first position and the second diorama is adjacent to the display screen in the second position.

2. The display system of claim **1**, where the character generator is responsive to the sensor to alter display of the virtual character on the screen as engaging in activities associated with a theme of the diorama adjacent to the screen.

3. The display system of claim **1**, where the character generator is configured to generate and display images of a virtual character on the screen based on the detected screen position in relation to the housing.

4. The display system of claim **1**, further comprising a control input coupled to the character generator for generating input signals.

5. The display system of claim **1**, wherein the housing includes a junction and the screen is mounted to the housing at the junction.

6. The display system of claim **1**, wherein the junction includes a hinge.

7. A display system comprising:
a housing;
a hinge mounted to the housing;
a transparent screen viewable from two sides and mounted to the hinge at a screen edge to allow rotation of the screen relative to the housing;
a rotation sensor mounted on the housing to detect screen rotation; and
a character generator configured to generate and display images of a virtual character on the screen;
wherein the character generator is configured to reverse an orientation of the displayed images when the screen is rotated about an axis of the hinge.

8. A display system comprising:
a housing;
a hinge mounted to the housing;
a transparent screen viewable from two sides and mounted to the hinge at a screen edge to allow rotation of the screen relative to the housing;
a rotation sensor mounted on the housing to detect screen rotation; and
a character generator configured to generate and display images of a virtual character on the screen;
wherein the character generator is configured to translate a first position of the virtual character on the screen to a second position when the screen is rotated about an axis of the hinge.

9. A display system comprising:
a housing;
a hinge mounted to the housing;
a transparent screen viewable from two sides and mounted to the hinge at a screen edge to allow rotation of the screen relative to the housing;
a rotation sensor mounted on the housing to detect screen rotation;
a character generator configured to generate and display images of a virtual character on the screen; and
a first diorama and a second diorama with respective first and second distinct themes, the first diorama and the second diorama being supported on the housing at spaced positions.

10. The display system of claim 9, wherein the screen is adapted to be rotated between a first position adjacent to the first diorama and a second position adjacent to the second diorama.

11. The display system of claim 10, wherein the first diorama is visible through the screen in the first position and the second diorama is visible through the screen in the second position.

12. The display system of claim 11, wherein the character generator is configured to display the character on the screen as engaging in activities associated with the theme of the diorama adjacent to and visible through the screen.

13. A display system comprising:
a housing;
a movable screen connected to the housing to display a virtual character that engages in activities;
a sensor mounted on the housing to detect screen position in relation to the housing; and
a character generator operably connected to the sensor and configured:
in response to positioning the screen in a first position, to generate and display the virtual character engaging in a first activity; and
in response to positioning the screen in a second position, to generate the virtual character engaging in a second activity.

14. The display system of claim 13, further comprising:
a first diorama with a first theme; and
a second diorama with a second theme distinct from the first theme,
wherein the first diorama is adjacent to the moveable screen in the first position and the second diorama is adjacent to the moveable screen in the second position.

15. The display system of claim 14, wherein the first activity is related to the first theme and the second activity is related to the second theme.

16. The display system of claim 13, wherein the sensor includes a rotation sensor mounted on the housing to detect screen rotation.

17. The display system of claim 13, wherein the character generator maintains a virtual character orientation continuity at least in part by translating or inverting a position of the virtual character on the screen.

18. The display system of claim 13, further comprising a user control input, wherein the character generator is further configured, in response to input from a user at the control input, to portray the virtual character as engaging in additional activities.

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